Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

1169064282

MATHEMATICS **0580/42**

Paper 4 (Extended) **February/March 2015**

2 hours 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 130.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

© UCLES 2015

1 Jaideep builds a house and sells it for $450 000.

(a) He pays a tax of 1.5% of the selling price of the house.

Show that he pays $6750 in tax.

Answer(a)

[1]

(b) $6750 is 12.5% more than the tax Jaideep paid on the first house he built.

Calculate the tax Jaideep paid on the first house he built.

Answer(b) $..... [3]

(c) The house is built on a rectangular plot of land, 21 m by 17 m, both correct to the nearest metre.

Calculate the upper bound for the area of the plot.

Answer(c) ..... m^2 [2]

(d) On a plan of the house, the area of the kitchen is 5.6 cm^2.
The scale of the plan is 1 : 200.

Calculate the actual area of the kitchen in square metres.

Answer(d) ..... m^2 [2]

© UCLES 2015

(e) The house was built using cuboid blocks each measuring 12 cm by 16 cm by 27 cm.

Calculate the volume of one block.

Answer(e) ..... cm^3 [2]

(f) Jaideep changes \$12 000 into euros (€) to buy land in another country.
The exchange rate is €1 = \$1.33 .

Calculate the number of euros Jaideep receives.
Give your answer correct to the nearest euro.

Answer(f) €..... [3]

2 **(a)** x is an integer.

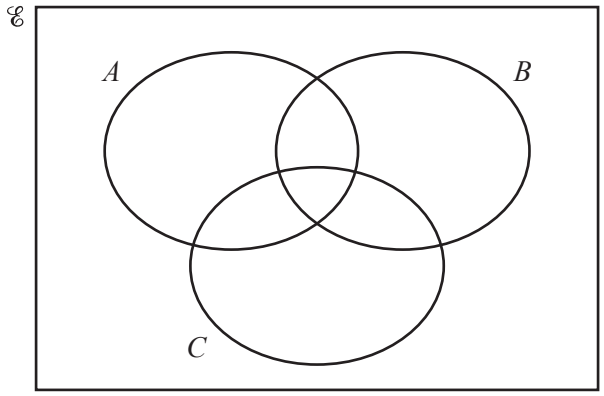
$\mathscr{E} = \{x: 1 \leqslant x \leqslant 10\}$

$A = \{x: x \text{ is a factor of } 12\}$

$B = \{x: x \text{ is an odd number}\}$

$C = \{x: x \text{ is a prime number}\}$

(i) Complete the Venn diagram to show this information.



[3]

(ii) Use set notation to complete each statement.

6 ..... A

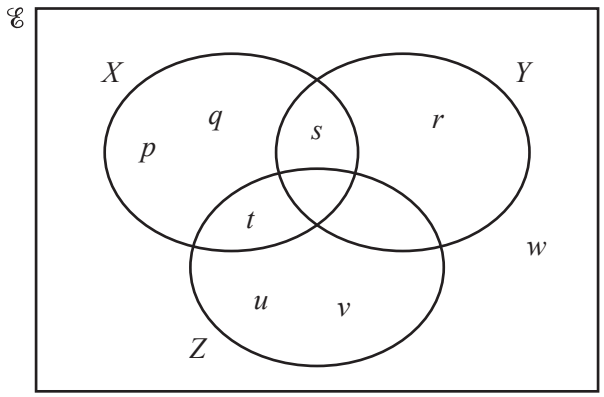
$A \cap B \cap C =$ .....

$A \cap A' =$ ..... [3]

(iii) Find n(B).

Answer(a)(iii) ..... [1]

(b)



(i) Use set notation to complete the statement.

$\{u, v\}$ ..... Z [1]

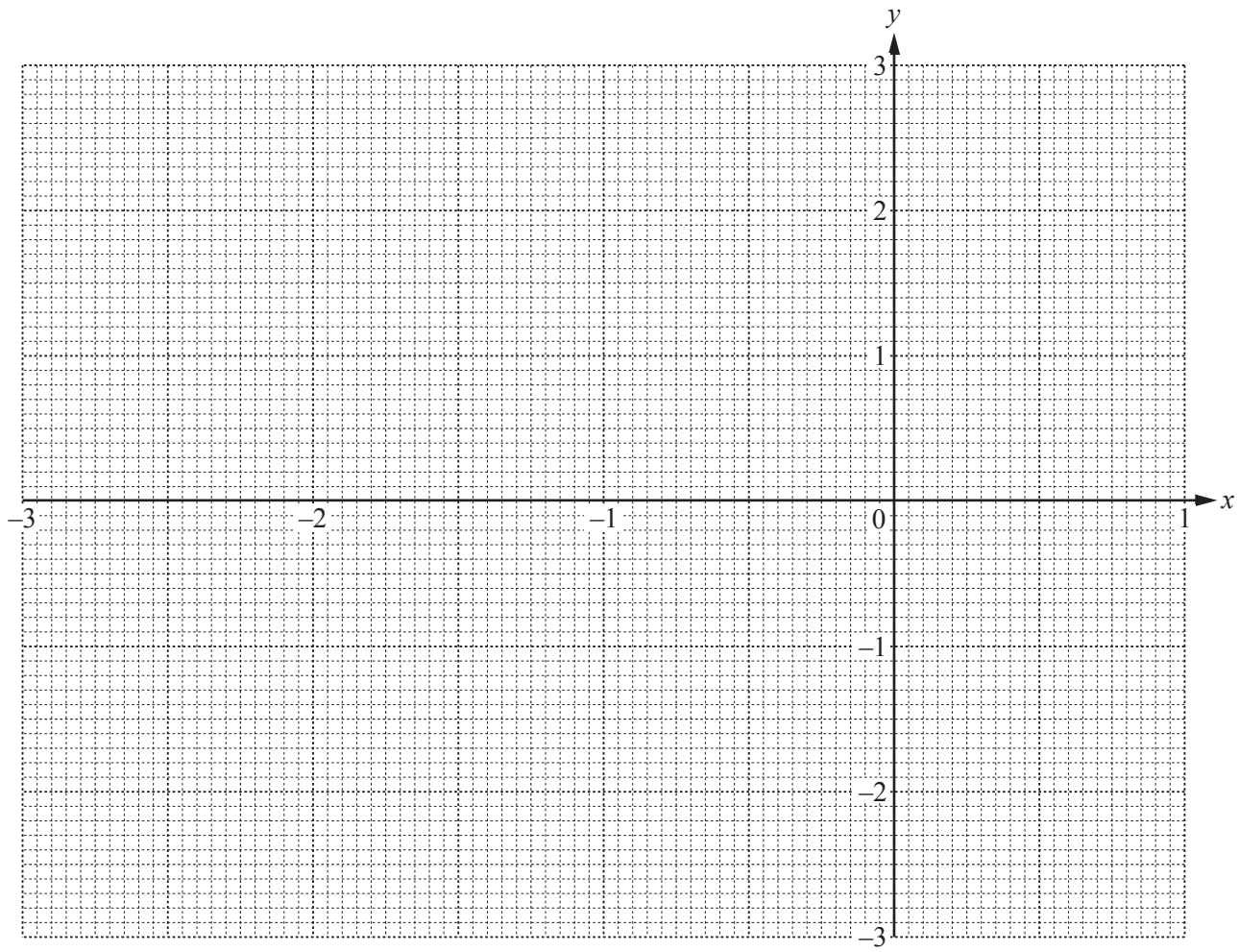
(ii) Shade $X \cap (Z \cup Y)'$. [1]

3 The table shows some values of $y = x^3 + 3x^2 - 2$.

x	–3	–2.5	–2	–1.5	–1	–0.5	0	0.5	1
y	–2	1.13		1.38		–1.38		–1.13	

(a) Complete the table of values. [3]

(b) On the grid, draw the graph of $y = x^3 + 3x^2 - 2$ for $-3 \leqslant x \leqslant 1$.



[4]

(c) By drawing a suitable line, solve the equation $x^3 + 3x^2 - 2 = \frac{1}{2}(x + 1)$.

Answer(c) $x =$ ..... or $x =$ ..... or $x =$ ..... [4]

(d) By drawing a suitable tangent, find an estimate of the gradient of the curve at the point where $x = -1.75$.

Answer(d) ..... [3]

4 **(a)** Factorise $121y^2 - m^2$.

Answer(a) ..... [2]

(b) Write as a single fraction in its simplest form.

$$\frac{4}{3x - 5} + \frac{x + 2}{x - 1}$$

Answer(b) ..... [3]

(c) Solve the equation.

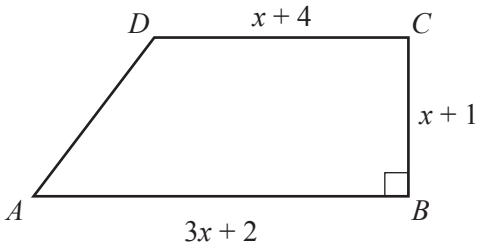
$$3x^2 + 2x - 7 = 0$$

Show all your working and give your answers correct to 2 decimal places.

Answer(c) x = ... or x = ... [4]

© UCLES 2015

(d) In this part, all lengths are in centimetres.



NOT TO SCALE

ABCD is a trapezium with area 15 cm^2.

(i) Show that $2x^2 + 5x - 12 = 0$.

Answer(d)(i)

[3]

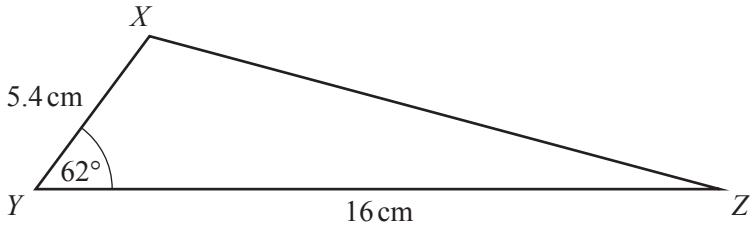
(ii) Solve the equation $2x^2 + 5x - 12 = 0$.

Answer(d)(ii) $x =$ ..... or $x =$ ..... [3]

(iii) Write down the length of *AB*.

Answer(d)(iii) *AB* = ... cm [1]

5 (a)



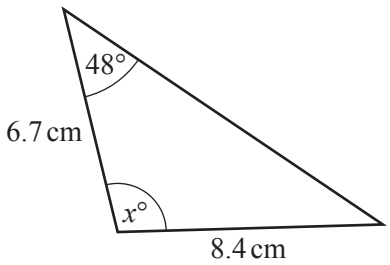
NOT TO SCALE

Show that the area of triangle XYZ is 38.1 cm^2, correct to 1 decimal place.

Answer(a)

[2]

(b)

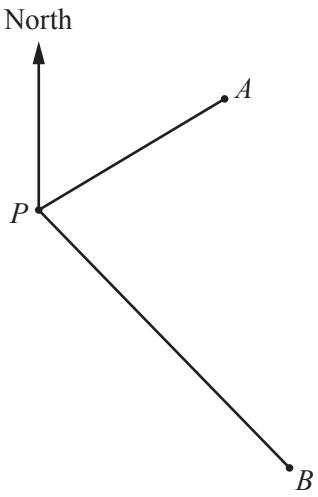


NOT TO SCALE

Calculate the value of x.

Answer(b) x = ... [4]

(c)



NOT TO SCALE

Ship *A* is 180 kilometres from port *P* on a bearing of 063°.
Ship *B* is 245 kilometres from *P* on a bearing of 146°.

Calculate *AB*, the distance between the two ships.

Answer(c) ..... km [5]

6 In this question write any probability as a fraction.

Navpreet has 15 cards with a shape drawn on each card.
5 cards have a square, 6 cards have a triangle and 4 cards have a circle drawn on them.

(a) Navpreet selects a card at random.

Write down the probability that the card has a circle drawn on it.

Answer(a) ..... [1]

(b) Navpreet selects a card at random and replaces it.
She does this 300 times.

Calculate the number of times she expects to select a card with a circle drawn on it.

Answer(b) ..... [1]

(c) Navpreet selects a card at random, replaces it and then selects another card.

Calculate the probability that

(i) one card has a square drawn on it and the other has a circle drawn on it,

Answer(c)(i) ..... [3]

(ii) neither card has a circle drawn on it.

Answer(c)(ii) ..... [3]

(d) Navpreet selects two cards at random, without replacement.

Calculate the probability that

(i) only one card has a triangle drawn on it,

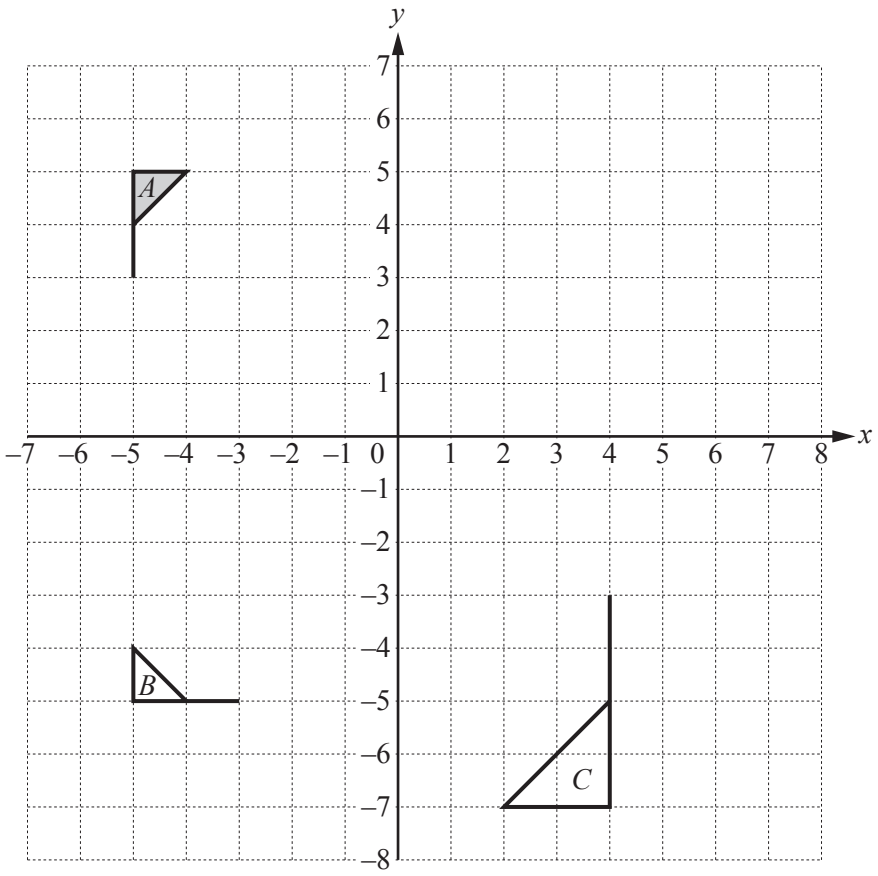
Answer(d)(i) ..... [3]

(ii) the two cards have different shapes drawn on them.

Answer(d)(ii) ..... [4]

© UCLES 2015

7



(a) Describe fully the **single** transformation that maps

(i) flag *A* onto flag *B*,

Answer(a)(i) .....

..... [3]

(ii) flag *A* onto flag *C*.

Answer(a)(ii) .....

..... [3]

(b) Draw the image of flag *A* after a translation by the vector $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$. [2]

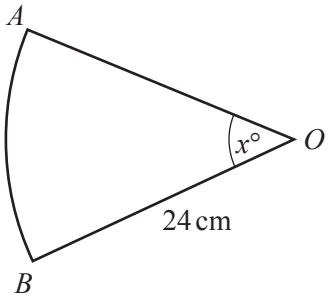
(c) Draw the image of flag *A* after a reflection in the line $x = 1$. [2]

(d) Describe fully the **single** transformation represented by the matrix $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$.

Answer(d) .....

..... [2]

8 **(a)** The diagram shows a sector of a circle with centre O and radius 24 cm.



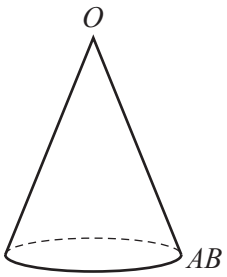
NOT TO SCALE

(i) The total perimeter of the sector is 68 cm.

Calculate the value of x.

Answer(a)(i) x = ... [3]

(ii) The points A and B of the sector are joined together to make a hollow cone.
The arc AB becomes the circumference of the base of the cone.



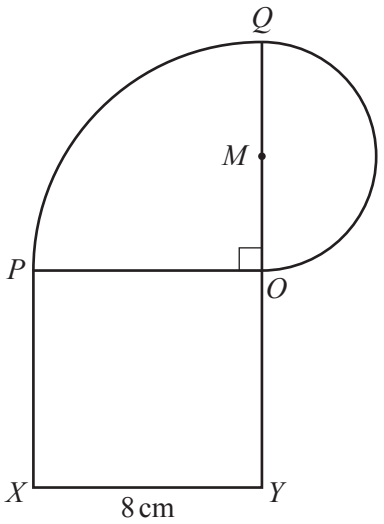
NOT TO SCALE

Calculate the volume of the cone.

[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

Answer(a)(ii) ..... cm^3 [6]

(b)



NOT TO SCALE

The diagram shows a shape made from a square, a quarter circle and a semi-circle.
OPXY is a square of side 8 cm.
OPQ is a quarter circle, centre *O*.
The line *OMQ* is the diameter of the semi-circle.

Calculate the area of the shape.

Answer(b) ..... cm^2 [5]

9 The table shows the height, h cm, of 40 children in a class.

Height (h cm)	$120 < h \leqslant 130$	$130 < h \leqslant 140$	$140 < h \leqslant 144$	$144 < h \leqslant 150$	$150 < h \leqslant 170$
Frequency	3	14	4	6	13

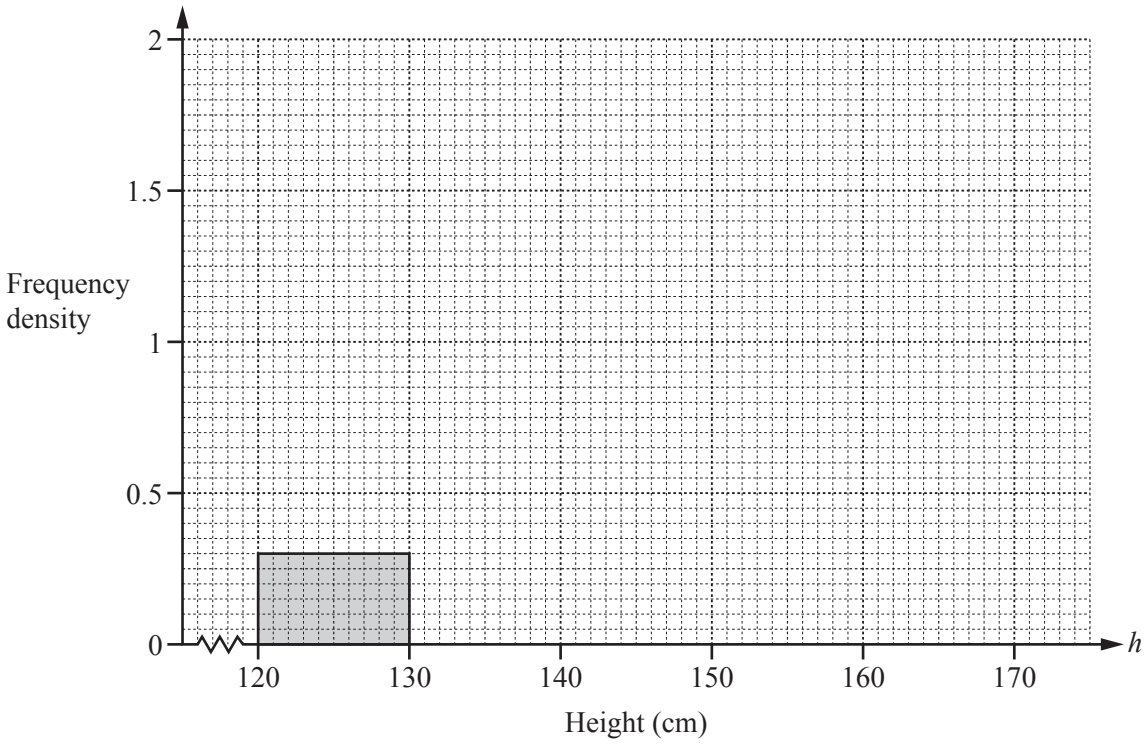
(a) Write down the class interval containing the median.

Answer(a) ..... $< h \leqslant$ ..... [1]

(b) Calculate an estimate of the mean height.

Answer(b) ..... cm [4]

(c) Complete the histogram.



[4]

10 The school cook buys potatoes in small sacks, each of mass 4 kg, and large sacks, each of mass 10 kg.
He buys x small sacks and y large sacks.
Today, he buys less than 80 kg of potatoes.

(a) Show that $2x + 5y < 40$.

Answer(a)

[1]

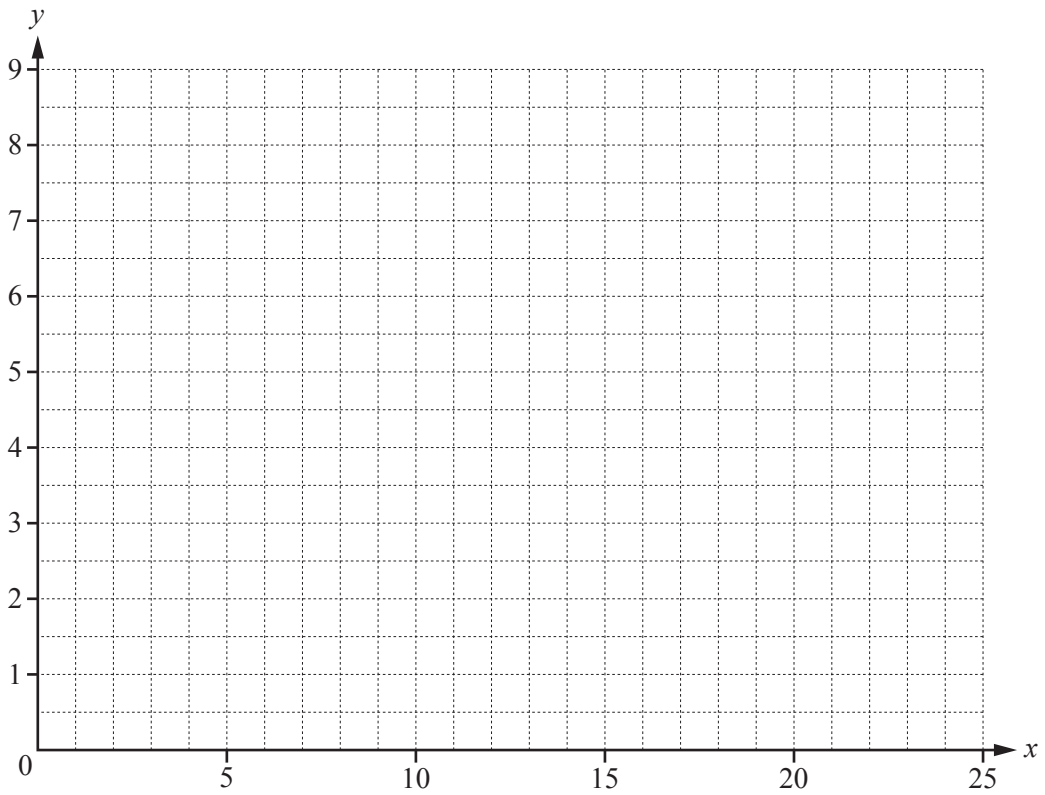
(b) He buys more large sacks than small sacks.
He buys no more than 6 large sacks.

Write down two inequalities to show this information.

Answer(b) .....

..... [2]

(c) On the grid, show the information in **part (a)** and **part (b)** by drawing three straight lines and shading the unwanted regions.



[5]

(d) Find the greatest mass of potatoes the cook can buy today.

Answer(d) ..... kg [2]

Question 11 is printed on the next page.

11

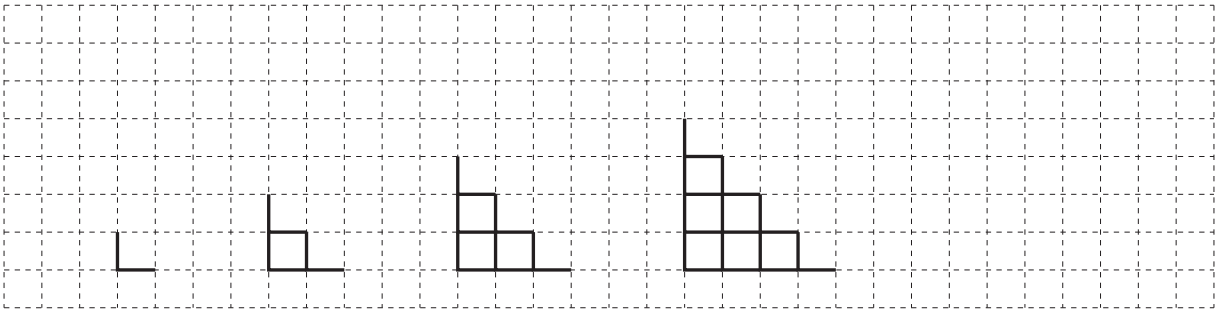


Diagram 1 Diagram 2 Diagram 3 Diagram 4 Diagram 5

Diagram 1 shows two lines of length 1 unit at right angles forming an L.

Two Ls are added to Diagram 1 to make Diagram 2. This forms one small square.

Three Ls are added to Diagram 2 to make Diagram 3. This forms three small squares.
The sequence of Diagrams continues.

(a) Draw Diagram 5. [1]

(b) Complete the table.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5
Number of lines of length 1 unit	2	6	12	20	
Number of small squares	0	1	3	6	

[2]

(c) Find an expression, in terms of n, for the number of lines of length 1 unit in Diagram n.

Answer(c) ..... [2]

(d) Find an expression, in terms of n, for the number of small squares in Diagram n.

Answer(d) ..... [2]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.